quartz (β -SiO_2) and/or β -quartz solid solution (β -SiO_2 solid solution) as a predominant crystal phase.

33. (original) Glass-ceramics as defined in claim 32 comprising, in mass %, Li_2O within a range of 3.5 – 4.5%.

34. (original) Glass-ceramics as defined in claim 33 comprising, in mass %,

MgO	0.5 – 1.5% and/or
ZnO	0.1 – 1.5% and/or
CaO	0.5 – 1.5% and/or
BaO	0.5 – 1.5% and/or
TiO_2	1.5 – 3.0% and/or
ZrO_2	1.0 – 3.0% and/or
As_2O_3	0.5 – 1.0%.

REMARKS

The application was filed with 34 claims and it has been noted that the Examiner did not act on claims 32-34. For this reason, an action on those claims is requested.

Claims 2, 4, 13-16 and 25-28 were rejected under 35 U.S.C.§112, second paragraph, for failing to particularly point out and distinctly claim the subject matter that the applicant regards as the invention.

Reconsideration is requested.

Claims 2 and 4 have been amended to point out that mass% is the ratio and claims 13-16 and 25-28 have been amended to adopt the Examiner's suggestion to replace "using" with –comprising--.Claim 23 has been revise to correct an inadvertent typographical error. For these reasons, it is requested that this ground of rejection be

withdrawn.

Claims 1, 3, 5-20, and 24-28 were rejected under 35 U.S.C.§103(a) as obvious over Morimoto et al. (Morimoto).

Reconsideration is requested.

Claims 1 and 3 have been amended to include the recitation that the ratio of P_2O_5 to Al_2O_3 is within a range from 0.270 to 0.330. It has been found that, in glass-ceramics similar to the glass-ceramics of the present invention, the property of thermal expansion depends largely upon slight variations in the ratio of P_2O_5 to Al_2O_3. This has led to the discovery that by limiting the ratio of P_2O_5 to Al_2O_3 , as defined in the amended claims, the ultra-low thermal expansion coefficient defined in the claims can be achieved. The attached appendix provides calculations of the ratios of P_2O_5 to Al_2O_3 for the Morimoto examples. There is no example in Morimoto that falls within the claimed ratio of P_2O_5 to Al_2O_3 that is set forth in the amended claims and no suggestion to modify any example to achieve such a ratio. In addition to achieving an ultra low thermal expansion property, the claimed composition has a stabilized $\Delta L/L$ temperature dependency curve, namely a maximum variation of 1ppm or below at temperatures of from 0 to -50°C. For these reasons, it is requested that this ground of rejection be withdrawn.

Claims 1-34 were rejected under 35 U.S.C.§102(b) as anticipated by or in the alternative under 35 U.S.C.§103(a) as obvious over DE 1902432.

Reconsideration is requested.

The amended claims point out that the glass-ceramics of the invention will always comprise CaO which is an important component having effects on the melting and refining properties as well as the thermal expansion properties.

The ceramics of DE 190432 do not contain CaO and there is no suggestion to add this component to the compositions that are disclosed by this reference. The DE 190432 reference discloses glass-ceramics having a thermal expansion coefficient of $0.2X10^{-7}$/°C (within a temperature range of 20-30°C). The glass-ceramics of the present invention, however, not only have a low thermal expansion coefficient but also have a achieved stabilization of the $\Delta L/L$ temperature dependency curve, namely, a maximum temperature variation of 1 ppm or below within the temperature range of from 0 to -50°C. This concept is not suggested by DE 1902432 and it is requested that this ground of rejection

be withdrawn.

Claims 1-5, 8-18, 20 and 24-28 were rejected under 35 U.S.C.§102(b) as anticipated by or in the alternative under 35 U.S.C.§103(a) as obvious over Lindig et al. (Lindig).

Reconsideration is requested.

Lindig discloses compositions which do not have the ratio of P_2O_5 to Al_2O_3 which is specified in the amended claims. Lindig teaches that the ΔL/L temperature dependency curve for the disclosed glass-ceramics is 10 ppm or lower within a temperature range from -50 to +100°C. In the present invention, the ΔL/L temperature dependency curve for the disclosed glass-ceramics is less than 1 ppm or below within a temperature range of 0 to -50°C. For these reasons, the concept of the present invention is not disclosed by Lindig and it is requested that this ground of rejection be withdrawn.

Claims 1-31 were rejected under 35 U.S.C.§102(b) as anticipated by or in the alternative under 35 U.S.C.§103(a) as obvious over Goto.

Reconsideration is requested.

The Goto Examples have a thermal expansion coefficient of $0.2X10^{-7}$/°C. or below and they fail to provide any information regarding the claimed ratio of P_2O_5 to Al_2O_3.

Goto also fail to teach that the disclosed glass-ceramics have a ΔL/L temperature dependency curve for the disclosed glass-ceramics of less than 1 ppm or below within a temperature range of 0 to -50°C. For these reasons, it is requested that this ground of rejection be withdrawn.

An early and favorable action is earnestly solicited.

Respectfully submitted,

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APPENDIX

	Morimoto						
	ex.1	ex.2	ex.3	ex.4	ex.5	ex.6	ex.7
SiO2	66.0	66.6	66.0	68.5	69.4	68.7	83.5
Al2O3	19.7	19.8	19.8	18.0	21.5	18.0	21.5
P2O5	0.8	1.0	0.5	0.8	1.1		1.8
P2O5/SiO2	0.0121	0.0150	0.0076	0.0117	0.0174	0.0000	0.0252
P2O5/Al2O3	0.0406	0.0505	0.0253	0.0444	0.0509	0.0000	0.0744

	Lindig											
	ex.1	ex.2	ex.3	ex.4	ex.5	ex.6	ex.7	ex.8	ex.9	ex.10	ex.11	ex.12
SiO2	63.00	61.00	57.00	53.00	61.00	61.50	60.00	59.70	57.00	67.00	67.00	67.00
Al2O3	21.50	21.50	22.50	23.50	22.50	20.50	21.50	22.50	23.40	22.50	22.50	22.50
P2O5		2.00	5.00	8.00	1.00	3.00	2.50	3.00	3.45	5.00	5.00	5.00
P2O5/SiO2	0.0000	0.0328	0.0877	0.1509	0.0164	0.0492	0.0407	0.0500	0.0578	0.0877	0.0877	0.0877
P2O5/Al2O3	0.0000	0.0930	0.2222	0.3404	0.0444	0.1463	0.1163	0.1333	0.1474	0.2222	0.2222	0.2222

	Goto				
	ex.4	ex.5	ex.6	ex.8	ex.12
SiO2	56.00	57.00	57.00	54.50	55.00
Al2O3	24.00	23.00	22.00	24.00	24.00
P2O5	8.00	8.50	6.70	8.50	8.00
P2O5/SiO2	0.1429	0.1491	0.1526	0.1560	0.1456
P2O5/Al2O3	0.3333	0.3696	0.3955	0.3542	0.3333